Abstract of dissertation entitled

"An Evidence-Based Guideline of Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension"

Submitted by

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Hypertension is one of the most common chronic medical problems around the world and it is an important public health challenge. Hypertension can lead to cerebrovascular disease, ischemic heart disease, renal failure, myocardial infraction or stroke. According to the statistics from the Census and Statistics Department, it revealed that the ratio of people with known hypertension was about 11.0% in 2011/12. Exposure to stress has been evidenced by different studies as a risk factor for hypertension. Stress included occupational stress, stressful events from the social environment, and low socioeconomic status. Progressive muscle relaxation therapy
plays an important role in controlling hypertension apart from the traditional management such as the use of medication or diet control.

**Objective**

The objectives of the translational nursing research are to develop an evidence-based guidelines for hypertension patients to maintain an optimal blood pressure level.

**Methods**

5 electronic databases including Medline (Ovid SP) (1950 – Aug week 4 2012), Pubmed, ISI web of knowledge (1956- Aug 2012), The PsycINFO database (1980-Aug 2012) and Cochrane Library (1950- Aug 2012) are used for systematic search of literature. Five suitable are identified while three studies are randomized controlled trials and two are quasi-experimental design. The 5 studies were summarized and a table of evidence is formed. The Scottish Intercollegiate Guidelines Network (SIGN) checklist was used for critical appraisal. The findings indicate that progressive muscle relaxation exercise has significant effects in maintaining optimal blood pressure for hypertension patients. In order to implement the evidence-based protocol, an implementation plan is developed. A pilot test is implemented before the full-scale implementation of innovation. An evaluation plan is developed in order to assess the effectiveness of the program.
Conclusion

There are all together 8 recommendations are made in this protocol which based on the 5 chosen studies. According to SIGN’s “Grades of Recommendation”, all 8 recommendations in the protocol are graded as “A”. The innovation is proposed to implemented at an outpatient clinic for the hypertension patients. The progressive muscle relaxation exercise would be last for 6 weeks, which is effective in maintaining optimal blood pressure in hypertension patients. In the views of the transferability of the evidences, the feasibility and the cost-effectiveness of the program, the proposed program is considered as rewarding to carry out at the outpatient clinic in Hong Kong.
An Evidence-Based Guideline:

Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension

by

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Declaration

I declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

Signed____________________

CHUNG Ka-yi
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Chapter 1

Introduction

1.1 Background

Hypertension is one of the most common chronic medical problems around the world (Park, Song, Cho, Lim, Song and Kim, 2011). It is a common global phenomenon and an important public health challenge. It is the disease that affects all ages of people. Blood pressure will increase with age and the age of the general population is in the increasing trend thus the prevalence of hypertension is likely to be rose (MacGregor & Kaplan, 2010).

Hypertension is estimated to be responsible for 4.5 % of the burden of current global diseases. The number of people who are suffering from hypertension in Hong Kong is also increasing. According to the surveys which conducted by the Census and Statistics Department, it revealed that the ratio of people with known hypertension while in 2008, from 9.3 % increased to 10.3% in 2009/10 and 11.0% in 2011/12 respectively. (CHP, 2013)

According to the American Joint National Committee, high blood pressure is defined while systolic blood pressure is equal to or greater than 140 mmHg and diastolic blood pressure equal to or greater than 90 mmHg (Lip, 2003).

According to the Morbidity and Mortality Weekly Report (2013), hypertension is
a leading cause of cardiovascular disease. Hypertension is also considered as a "silent killer" as it does not have any warning signs. Some of them may not aware that they have hypertension until they were found to have cerebrovascular disease, ischemic heart disease, renal failure, myocardial infraction or stroke (Whelton, He and Muntner, 2008). Another studies have shown evidence that better control of the elevated blood pressure can reduce the risk for morbidity and mortality due to cardiovascular diseases (Law, Morris & Wald, 2009).

Exposure to stress has been evidenced by different studies as a risk factor for hypertension. Stress included occupational stress, stressful events from the social environment, and low socioeconomic status (Spruill, 2010). Relaxation therapy plays an important role in controlling hypertension apart from the traditional management (Cheung et al., 2005). Therefore, apart from the tradition methods in controlling blood pressure including medication, we would like to introduce progressive muscle relaxation exercise in controlling blood pressure.

1.2 Affirming the needs

Prevalence of hypertension and its consequences

Hypertension can be defined as primary or essential hypertension and secondary hypertension (Chockalingam, 2008). For the causes of primary hypertension, there are always no identifiable causes but it is often associated with some risk factors for
primary hypertension. They are the consumption of high salt intake, being overweight, lack of physical activities, excessive alcohol intake, having the habit of smoking, diabetes, family history of hypertension and stress. For secondary hypertension, there are well-defined causes which are responsible for the higher than normal blood pressure, such as renal diseases or endocrine disorders (Beevers, Lip & O'Brien, 2001). If the diseases are being cured, the blood pressure of the patients can be return to normal.

Untreated or poorly controlled hypertension can lead to the development of different complications to different organs. It increases the risk of cardiovascular diseases such as stroke, coronary artery disease, heart failure, dementia, nephropathy, and are at risk of developing other chronic diseases such as diabetes (Freitag & Vasan, 2003; Graham, Sketris, Burge & Edwards, 2006). If the systolic blood pressure rose higher than normal, it will also increase the mortality and morbidity. Evidence showed that a reduction in systolic blood pressure of 5 mmHg can reduce the mortality of cardiovascular diseases by 7 % and the incidence of having stroke by 30% (Dusek et al., 2008)

**Worldwide statistics:**

According to the statistics from the World Health Organization (2012), there are nearly one billion people having hypertension around the world. By the Year of 2025,
it is projected that 1.56 billion people will be living with hypertension (Kearney, Whelton, Reynolds, Muntner, Welton and He, 2005).

Local statistics:

In Hong Kong, according to the statistics of the Population Health Survey 2003/2004, the prevalence of hypertension who aged 15 years old and above was 27.2%, with 30.1% for males and 24.9% for females respectively (Center for Health Promotion, 2007). There were more than 610 000 people in Hong Kong were suffered from hypertension as reported by the Thematic Household Survey that conducted by the Census and Statistics Department from February to May 2008 (Centre for Health Promotion, 2010). It affects 1 in 5 adults in Hong Kong (Cheung et al., 2003).

Economic burden of hypertension

US spent more than $93.5 billion per year in hypertension-related diseases, which accounted for 17% of the total US health expenditure every year (Gaziano, Bitton & Weinstein, 2009).

In Hong Kong, according to the statistics that provided by Hospital Authority (2004), medical expenditure on the complications that caused by hypertension is in the increasing trend. It will increase stroke to 31% that admitted to hospitals. There is also a rise of the admission of stroke cases from 21,900 cases in 1997 to 28,600 cases in 2004 (Hospital Authority, 2004).
During Year 2002/03, the total cost of over HK$0.9 billion and over 300,000 bed days of the serious diseases that caused by hypertension, such as cardiovascular diseases and stroke. From the above statistics, hypertension is really a costly to our health care system (Hospital Authority, 2003).

**Current management of hypertension**

Different research studies showed that lifestyle modification interventions for hypertension included adapting DASH diet, increasing physical activities, limiting salt intake and alcohol consumption can help lowering the blood pressure level (Burke, Mori, Giangiulio, Gillam, Beilin & Houghton, 2002).

Hypertension controlled by lifestyle modification and pharmacological intervention can lead to beneficial effect in maintaining optimal level of blood pressure MacGregor & Kaplan, 2010). It is important for hypertension patients to adopt healthy lifestyles. It is always beneficial to start managing hypertension with non-pharmacological measures to maintain blood pressure at an optimal level before commencing on antihypertensive drug. Different types of lifestyle modifications may have different levels of falls in blood pressure and it can also improve the risk factors of developing cardiovascular diseases (Lip, 2003). Lifestyle modification is beneficial in reducing the blood pressure, increasing efficacy of the hypertensive drug and reducing the risks of developing different kinds of complications that induced by
hypertension (Shankie, 2001).

The following interventions are the current management for hypertension in Hong Kong.

*Smoking cessation*

We should make our effort to persuade our patients to quit smoking. It is the most effective way to reduce the cardiovascular risk in hypertension patients (Beevers, Lip & O'Brien, 2001).

*Exercise*

Various studies showed that exercise is useful in blood pressure reduction. Doing exercise three to four times per week with 30 to 45 minutes each time showed positive effect in decreasing the blood pressure (Beevers, Lip & O'Brien, 2001).

*Limited alcohol consumption*

Association between alcohol consumption and blood pressure are well-established. Daily intake of 80g or equivalent to 4 cans of beers can led to a raise in blood pressure (Stranges et al., 2004).

*Weight management*

The association of hypertension and overweight is well documented. The patients are advised to keep the normal body mass index from 18.5 to 22.9 kg/m². The systolic and diastolic blood pressure showed improvement while there is a loss in body weight.
A 3kg loss gives a fall in the systolic and diastolic blood pressure of around 7mmHg and 4 mmHg respectively (Beevers, Lip & O'Brien, 2001).

Limited salt intake

Increase the consumption of salt is also associated with high blood pressure. Salt limited to 2300 mg/ day has shown significant effect in reducing blood pressure (CDC, 2011). A reduction of sodium intake is encouraged in hypertension patients in order to maintain a better blood pressure level (Beevers, Lip & O'Brien, 2001).

Adoption of Dietary Approaches to Stop Hypertension (DASH) diet

Patients are encouraged to adopt a balanced diet which contains a large proportion of dietary fibers such as fruits and vegetables, low fat dairy products in order to limit the consumption of saturated fat (Beevers, Lip & O'Brien, 2001).

1.3 Significance of the problem

Apart from the above lifestyle interventions in maintaining optimal level of blood pressure that mentioned above, stress management is also one of the important issues to be discussed with our hypertensive patients. However, in our routine work in hypertension, we seldom mention stress management with our hypertensive patients. There is a gap between the current practice of hypertension in stress management in hypertensive patients.

Stress is known as one of the factors that to be responsible for the elevate blood
pressure (Dusek et al, 2008). While humans react to stress, the "fight or flight" mechanism will help them in responding when they perceive a threat and help the body exert energy to fight or run away. In this response, the adrenal glands release epinephrine, causing the blood vessels to constrict and heart rate to increase, and blood pressure will increase (Tsigos & Chrousos, 2002). Different relaxation therapies such as transcendental meditation, cognitive therapy, breathing exercise, imagery and yoga showed significant reduction in systolic and diastolic blood pressure.

As we live in Hong Kong, we all know that Hong Kong people are under great stress. The current management on high blood pressure which focuses on diet, exercise and medication can be one of the effective measures in maintaining optimal blood pressure. Evidence showed that adoption of lifestyles modification can reduce the systolic blood pressure by 2 mmHg to 20 mmHg (Department of Health, 2008). Many people have excused that they are busy; therefore, they seldom do exercise but still maintaining a sedentary lifestyle. Moreover, Hong Kong always dine out so that they may not have a balanced eating habits. On the other hand, although anti-hypertensive drug are shown to be effective, they may induce side effects (Beevers, Lip & O'Brien, 2001). In addition, we seldom mention stress management for people with hypertension; therefore, I would like to introduce an easily learned procedure—progressive muscle relaxation exercise for the hypertension
Progressive muscle relaxation exercise was first found by Jacobson (1938). Evidence showed that it can reduce anxiety, psychological distress, lower blood pressure and improve patients' well being (Vancampfort et al., 2012). This exercise consists of different sets of procedures. It involves tensing and releasing different muscle groups. It first began with guided instructions for slow, paced breathing. Participants are then guided to feel the sensations of tension in their right and left hands and arms and then allow these muscles to relax completely. Participants are required to repeat this procedure in different muscle groups include face, neck, chest, shoulders, upper back, and abdomen and the right and left upper legs, calves, and feet. It is an easily learned procedure with no adverse effects were report. It is also a cost-effective procedure.

1.4 Objectives of the translational nursing research

- To Search the Data from the database related to progressive muscle relaxation therapy on hypertensive patients
- To Summarize & critique the quality of the papers found
- To Summarize & Synthesis all the findings and planning for the implementation guideline
- To develop an evaluation plan for the proposed exercise program for the
hypertension patients

1.5 Translational Nursing Research question

In general outpatient clinic, how effective is progressive muscle relaxation exercise in maintaining optimal blood pressure for adult patients with hypertension?

The PICO question is identified as follows:

P (Population): Patients with hypertension

I (Intervention): Training in progressive muscle relaxation exercise

C (Control): Routine hypertension care (Health education and medication)

O (Outcome): Better control of blood pressure
Chapter 2

Critical Appraisal

There is a relationship between progressive muscle relaxation exercise and maintaining optimal blood pressure level. The strategies in identifying the relevant studies in various database and critical appraisal will be discussed in this chapter.

2.1 Search and appraisal strategies

Identification of studies

Inclusion and exclusion criteria were set in order to search the potential studies. Five electronic databases were used to identify the potential papers which were provided by the University of Hong Kong. They were Medline (Ovid SP) (1950 – Aug week 4 2012), Pubmed, ISI web of knowledge (1956- Aug 2012), The PsycINFO database (1980- Aug 2012) and Cochrane Library (1950- Aug 2012). Details of the search strategies and search results were described in appendix A.

Inclusion criteria

The inclusion criteria were:

- Studies that included progressive muscle relaxation exercise;
- Studies that included hypertension patients;
- Studies that are for adult patients only (Aged 18 or above);
- Outcome measures included such as systolic blood pressure, diastolic blood
pressure, heart rate and pulse and

- Papers that were written by Chinese or English

**Exclusion criteria**

The exclusion criteria were:

- Review study;
- Systematic review;
- If the target participants were pregnant women;
- If the target participants with mental disorders and
- If the target participants were normotensive clients

**2.2 Data extraction**

After narrowing down the topic by using the inclusion and exclusion criteria, there were five papers were selected which were conducted from Year 2000 to 2007. Data extraction included the study types, level of evidence, number and characteristics of patients, interventions, comparison, length of follow up, outcome measures which were systolic blood pressure, diastolic blood pressure and the effect size. A table of evidence which was developed by Scottish Intercollegiate Guidelines Network (SIGN,2006) was used after extracting data from the paper. The table of evidence is shown in appendix E.
2.3 Critical Appraisal

Critical appraisal checklists which developed by the Critical Appraisal Skills Program was used to assess the methodological qualities of the five selected studies. It can be used to assess the randomized controlled trail. Results of the critical appraisal checklists for the five studies is shown in appendix D.

2.4 Summary of the results

Studies' characteristics

There were total one hundred and fifty five citations were identified after searching from five databases. After finishing review the titles and the abstract of the journals, ten citations were identified that may be related to my topic on hypertension and progressive muscle relaxation exercise. The next step was to review the full text of the potential papers. Finally, there were five studies that fully met the inclusion and exclusion criteria of my topic. It included three randomized controlled trials and two quasi-experimental studies. In addition, all the five studies conducted within the last thirteen years.

Participants’ characteristics

The five selected studies included total 459 participants, which ranged from 9 to 220 people in each study. These studies included both male and female who aged from 18 years old to 74 years old. All the hypertension participants received
progressive muscle relaxation exercise either in the intervention group or control group. All the patients were not suffer from mental illness, they did not participate in any other types of relaxation exercise. The five studies were conducted in different cities and countries included Hong Kong, Taiwan, Iran, Spain and USA.

**Interventions used**

Four out of five studies used progressive muscle relaxation exercise as the intervention. One study that was conducted in USA used transcendental mediation as an intervention and used progressive muscle relaxation as a control, therefore, this study also included in my study. All studies employed Jacobson's progressive muscle relaxation exercise as an intervention which focused on the tensing and relaxing different groups of the muscle. Patients were taught by trained person either nurses, therapist and psychiatrist to perform the progressive muscle relaxation exercise at least once a week with 30-60 minutes per session and have to practice at least once at home weekly.

**Length of follow up**

The length of follow up was various in five studies. It ranged from 30 days to one year. Some studies used the same blood pressure machine to measure the blood pressure for the participants. Some even measured the blood pressure for the participants nearly at the same time in each session. The participants also require to
measure blood pressure at home and made a record of their blood pressure level.

**Outcome measures**

All five studies included systolic blood pressure and diastolic blood pressure as the outcome measures. Three other studies also included heart rate and pulse as the outcome measures. These outcome measures are subjective and reliable. One study that done by Sheu, Irvin, Lin and Mar (2003) also measured the perceived stress scale scores and perceived health scale score as the outcome measures.

**2.5 Quality of the studies**

**Clearly stated question**

All the five studies have a clearly stated research questions and objectives. It allowed us to assess if the research objectives were met. Interventions, target populations and outcomes were also clearly stated in the objectives of the studies.

**Appropriate study design**

In the papers that I have selected, three studies were randomized controlled trials and two were quasi-experimental design. They were appropriate in its design. Four studies clearly described the intervention, comparisons and the outcome. They were aimed to compare the effect of progressive muscle relaxation exercise and the other types of methods in maintaining blood pressure in hypertensive patients. The study that was done by Yung, French and Leung (2001) compared different treatments
methods to different people without a control group, it was also regards as a RCT.

**Allocation of the participants**

All the studies stated that the participants were randomly allocated the intervention and control group. However, the methods that used for randomization were not mentioned in all five studies. Therefore, we did not know how they did the randomization. In addition, not all the studies mention the allocation concealment methods.

**Blinding**

In fact, there was a limitation of the studies that only single-blinded can be done as the patients must aware that they received the intervention of progressive muscle relaxation therapy as well as the trainers of the progressive muscle relaxation exercise must know about the intervention. Single-blinded method was used in the study which was done by Ranjbar, Akbarzadeh, Kazemi and Safaeiyan (2007), the cardiologist that provided diet advice and checked the drug complications was unaware of the allocation of the patients. In the study of Amigo, Fernandez, Gonzalez and Herrera (2002), the nurses and doctors who were involved in the study were blinded to the participants' treatment group, therefore, no medical decision would be affected.

**Conclusion accounted from all participants**

The length of study of two studies were rather short, which were 30 days and
4-week respectively (Yung, French and Leung, 2001; Sheu, Irvin, Lin and Mar, 2003). All the participants accounted for the conclusion in these two studies. The other study that was done by Amigo, Fernandez, Gonzalez and Herrera (2002), which the study was lasted for 6 months and all the participants were also accounted for the conclusion. The drop out rate for the study of Schneider et al (2005) was 24% and the drop out rate of Ranjbar, Akbarzadeh, Kazemi and Safaeiyan (2007) was 20%. The dropout rate was acceptable as the sample size were relatively large. In addition, these two studies used the method of intention to treat method to make the conclusion.

Follow up of participants

All the participants were follow-up and data were collected in a similar way. Different studies reviewed the results at different time intervals. There was different follow period which ranged from 30 days to 1 year. There was no missing data. In addition, the data were collected from both intervention and control groups.

Minimize the chance of play

Among the five studies, only one study mention about the power calculation. The study that was done by Ranjbar, Akbarzadeh, Kazemi and Safaeiyan (2007) mention that 91 patients in each group and total 182 patients were needed with 95% confidence interval with 80%. The other four studies did not mention the power
calculation. Therefore, we cannot determine if the sample size were adequate or not.

Main result

The main results were shown in the forms of standard deviation (SD), mean or p-values in all five studies. The main results were the systolic blood pressure, diastolic blood pressure, heart rate or pulse. The paper that was done by Sheu, Irvin, Lin and Mar (2003) also included the outcome measures of perceived stress scale scores and perceived health scale scores.

Precision of the data

All the papers presented the results with p-values. The paper that was done by Sheu, Irvin, Lin and Mar (2003) also included the result of standard deviation (SD). Four out of five studies showed a decrease in systolic blood pressure after implementing progressive muscle relaxation exercise to hypertensive patients. The results were statistically significant (p<0.05). While the study conducted in USA which was done by Schneider (2005) showed that there was not statistically significant in systolic blood pressure while it was still clinically significant in the reduction of systolic blood pressure.

All of the five studies showed there were a decrease in diastolic blood pressure with statistically significant (p<0.05).

Three studies reported the outcome measures of heart rates or pulse. Two of
them showed there were statistically significant ($p<0.05$) while one even showed that there was an increase in heart rate ($p=\text{NS}$).

The study that was conducted by Sheu, Irvin, Lin and Mar (2003) showed significant differences between experimental and control groups for pulse ($p<0.01$), systolic pressure ($p<0.01$) and diastolic pressure ($p<0.05$).

The other study that was done by Yung, French and Leung (2000) also showed statistically significant in SBP for pre-post treatment measures ($p<0.05$).

The above outcome measures matched the interested of my study and it can be used in my clinical setting. All of the results were either statistically significant or some were clinically significant.

**Applicable of the data**

The result of the studies can be applied to my topic that I am interested in. The population and the setting of the studies were similar to my interested target. Therefore, the results were applicable to my topic.

**Level of evidence**

According to the critical appraisal checklists adopted by the Critical Appraisal Skills Programme (Public Health Resource Unit, English, 2006; Public Health Resource Unit, English, 2004), three RCTs were rated 1++ and quasi-experimental studies were rated 1-. 
2.6 Summary of the data

The intervention in these five studies were took place in the clinic setting, which were similar to my own clinic setting. All the studies showed that progressive muscle relaxation exercise were either statistically significant or clinically significant.

All the five studies used the physiological parameters including systolic blood pressure and diastolic blood pressure as the outcome measures to assess the effectiveness of the progressive muscle relaxation exercise. Physiological parameters were an objective measurement and they were reliable tools. Pulse, heart rate, psychological state included perceived stress scale scores and perceived health scale scores were also used to assess the effectiveness of the progressive muscle relaxation exercise.

All the five studies have done a baseline measurement of blood pressure for the participants before implementing the progressive muscle relaxation exercise to the hypertensive participants. The post intervention systolic blood pressure and diastolic blood pressure were assessed after the intervention of progressive muscle relaxation exercise immediately; at 30 days follow up, 8-week follow up, 3 month, 6 month, 9 month and 12 month follow up in different studies.

For the selected population, there were total 459 participants which ranged from nine to two hundred and twenty participants in each study. They were adult
hypertensive patients who aged 18 to 74 male and female patients from different
countries or cities that recruited from their local hypertensive clinic. They included
patients who diagnosed mild to severe hypertension patients. The five studies were
conducted in Hong Kong, Taiwan, Iran, Spain and USA. From the results, we can see
that the intervention was effective in both developed and developing countries, which
included western and eastern countries or cities.

All the five studies showed there was a decrease in systolic blood pressure after
implementing progressive muscle relaxation exercise to hypertensive patients.

All of the five studies showed there were a decrease in diastolic blood pressure
with statistically significant (p<0.05). Three studies reported the outcome measures of
heart rates or pulse. Two of these studies were found statistically significant (p<0.05)
while one even showed that there was an increase in heart rate (p= NS). The results
were statistically significant (p<0.05). While the study conducted in USA which was
done by Schneider (2005) showed that there was not statistically significant in systolic
blood pressure while it was still clinically significant in the reduction of systolic blood
pressure.

The above outcome measures matched the interested of my study and it can be
used in my clinical setting. All of the results were either statistically significant or
some were clinically significant.
The intervention was done by the trained person such as nurses, therapists and psychiatrists. Some even used the same trainers throughout the whole process to ensure the standardization. One study also measured the psychological state.

Patients were advised to practice progressive muscle relaxation exercise in a quiet room. Before they practice the progressive muscle relaxation exercise, training would be provided to them and feedback would be given to ensure they did the procedure correctly. Patients were also given an audiotape in progressive muscle relaxation exercise so that they can practice it at home.

The studies that involved these measures showed a better decrease in systolic blood pressure and diastolic blood pressure in those participants.

All the studies showed that progressive muscle relaxation exercise is effective in maintaining optimal blood pressure in adult hypertensive patients. The systolic and diastolic blood pressure was lower after the implementation the progressive muscle relaxation exercise in the target populations.

2.7 Summary of the synthesis

In conclusion, all five studies that I have selected concluded that progressive muscle relaxation exercise has effect in maintaining an optimal level of blood pressure in adult hypertensive patients. It can lower the systolic and diastolic blood pressure which can minimize the risks of developing complications that induced by
high blood pressure such as cardiovascular diseases. In Hong Kong, for the current practice of hypertension, we always focus on lifestyle modification such as increasing physical activities, adopting a balanced diet, and limiting salt and alcohol consumption and smoking cessation. For the pharmacological intervention, we will make use of the antihypertensive drugs such as beta-blocker to maintain normal blood pressure level for the patients.

However, in our current practice, we seldom discuss stress management with our hypertensive patients which actually can do a lot of benefit with them. Evidence showed that stress is related to hypertension. Stress management is one of the interventions that can lower the blood pressure. Progressive muscle relaxation exercise is a cheap, non-invasive, easy to learn and implement technique. It can produce effect in a short period of time. We, as nurses who work at clinic can be trained to teach progressive muscle relaxation exercise and help our patients to have a better control with their blood pressure level.

As the five studies showed that progressive muscle relaxation exercise have the effect in blood pressure, it is worth to promote this innovative measure as it is beneficial for our adult hypertensive patients to adopt this progressive muscle relaxation exercise.

Apart from the traditional management of hypertension, we, as nurses, can play
an important role in implementing non-pharmacological intervention to hypertensive patients. We can introduce progressive muscle relaxation exercise to the hypertensive patients. It can use as an adjunctive, add-on therapy in hypertensive patients. We can hold the class of progressive muscle relaxation exercise once per week for continuous eight weeks with 30 minutes to one hour per session. We suggest providing a quiet, comfortable place for the patients to practice progressive muscle relaxation exercise in order to maintain privacy to the patients. It can also ensure the patients can perform the exercise without distraction. The patients can be advised to wear comfortable clothing to do the exercise. In addition, the same trained person can be the provider of the progressive muscle relaxation exercise. The use of same trainer throughout the same process can help with the standardization of the program. The trained nurse can be provided live demonstration of the exercise to the patients. It can help them to learn and perform the exercise properly. We can give feedback for the patients on their skills of performing progressive muscle relaxation exercise. Feedback from the trainers of progressive muscle relaxation exercise can ensure the patients fully understand the procedure and do the exercise correctly. Moreover, audiotapes on progressive muscle relaxation exercise can be given to the patients so that they can practice the exercise at home. The audiotape will contain the instructions for the exercise. It can ensure the standardization of progressive muscle relaxation exercise.
Finally, we can ask the patients to make the record of their blood pressure after performing the progressive muscle relaxation exercise. Hence, we can follow up with their progress.
Chapter 3

Implementation potential of an evidence-based innovation

It has been well-documented that uncontrolled blood pressure can lead to various complications in different organs such as heart, renal, brain and kidney, including arteriosclerosis, aneurysm, heart failure, stroke, renal failure and retinopathy. In my clinical setting, the current management of hypertension includes ongoing education to increase physical activity levels, improve diet and nutrition, limit salt intake, and maintain optimal body weight and use of anti-hypertensive medication. However, there is no standard protocol for nursing staff to introduce progressive muscle relaxation exercise to hypertensive patients. It has been discussed the benefits for patients with hypertension of having progressive muscle relaxation exercise in the previous chapter. These benefits include lowering the systolic and diastolic blood pressure which can lower the risk of developing the complications of cardiovascular diseases, renal diseases and stroke.

To ensure the evidence can be translated into the current practice, it is important to examine the implementation potential carefully. In the following, the implementation of teaching progressive muscle relaxation exercise to patients with hypertension in my current setting will be discussed in the aspects of 1. the transferability of the findings, 2. the feasibility, 3. potential risks and finally, 4. the
benefits and the cost-benefit ratio.

3.1 Target setting

Progressive muscle relaxation exercise will be proposed to apply in Hong Kong Families Clinic which under the Professional Development and Quality Assurance, Department of Health. The aims of the Professional Development and Quality Assurance (PDQA) Service is to provide quality health care services to the public; and to encourage the practice of development for the professional and quality assurance activities within the Department and primary healthcare services. The clients who can attend for doctor consultation include the government servants, pensioners and their family members. The patients with chronic illnesses such as hypertension and diabetes mellitus are usually having the regular follow-up at a three-month interval. There are around 1000 hypertension patients follow-up at our clinic monthly. In general, we will hold the support group on every Thursday afternoons for the hypertension patients. Therefore, we can ensure the planned program can run smoothly without any disturbance for the clinic operation. It can also ensure that we can have sufficient time and manpower for the progressive muscle relaxation program.

A designated hypertension care nurse would be appointed to be the in-charge of the program. She will be responsible for the implementation of the exercise program.
In addition, both doctors and nurses are encouraged to invite patients to join the program according to the eligibility criteria in the protocol.

3.2 Proposed venue

The proposed venue for the progressive muscle relaxation exercise training program is the health education room of the families clinic. It is equipped with a LCD monitor, a computer system, and a VCD system. It is around 500 square feet.

3.3 Target participants

The target participants of the program are the patients who aged eighteen years old or above, which diagnosed with hypertension and have regular follow-up at families clinic. They would be invited to attend the program. However, patients who are suffering from psychiatric problems would be excluded from the program.

3.4 Feasibility of the program in the local setting

Administrative support

The Department of Health is the Government's health adviser and agency to execute the health care policies and statutory functions. Its mission is to safeguard the health of the community through promotive, preventive, curative and rehabilitative services.

Evidence showed that better control of hypertension can reduce the risks of developing different kinds of complications.
As health care professionals, we are always reminded to be committed by providing quality client-oriented service. The department emphasis the importance of providing quality care to the patients. We are encouraged to implement the care which based on the evidence-based clinical guidelines.

*Interference of the normal function of the clinic*

As mentioned in the previous chapter, patients with hypertensive in our clinic setting are advised to have a healthy lifestyles including having a balance diet, limiting the salt and alcohol consumption and exercise. However, in the current practice, we only provided some factual information to them without any practical skills teaching or demonstration.

The proposed program will be held on every Thursday afternoon, which originally proposed to hold the support group for the hypertension patients. Therefore, no extra manpower is needed. However, the nurse of program- in- charge of the proposed program may need more time in starting up the program as there was no similar program held before.

3.5 Transferability of the findings

There is many existing evidences showed that hypertension patients who practice progressive muscle relaxation exercise will be benefit from it, it is worthwhile to do the implementation and assess if the evidences can be transferred to the local setting.
Similarity of the target setting

There were five identified studies and were all carried out in the outpatient clinic.

The target setting of the proposed program is also in an outpatient setting. The exercise in the reviewed studies was conducted in a quiet room. The proposed program will therefore hold in the health education room of the clinic.

There were three studies conducted in the Asian population, and the other two were conducted in the western countries, it is believed that cultural difference do not cause much difference in blood pressure because relaxation exercise is not cultural specific (Yung, French & Leung, 2000; Sheu, Irvin, Lin & Mar, 2003; Ranjbar, Akbarzadeh, Kazemi & Safaeiyan, 2007).

Similarity of the target participants

Progressive muscle relaxation exercise can be implemented in patients with hypertension and who are already received other hypertension treatments such as anti-hypertension medication, balance diet and healthy lifestyles, etc. In the reviewed papers, the duration of the interventions ranged from eight weeks to twelve months. They majority of them conducted the progressive muscle relaxation exercise with the treatment regimens. In the reviewed studies, the durations of the interventions were various, which ranged from 20 minutes to 45 minutes, but all showed positive outcomes with the patients with hypertension who practiced progressive muscle
relaxation exercise.

3.6 Cost-benefit ratio of the innovation

3.6.1 Costs for the innovation

Staff training and materials costs

Different costs needed to be estimated in order to implement the progressive muscle relaxation exercise. In order to make sure our nursing staff familiar with the progressive muscle relaxation exercise program, a two-hour lecture is proposed to hold for staff training. The content of the lecture include the knowledge of progressive muscle relaxation exercise and the flow of the program. Lectures will be holding on Saturday. As our clinic opening hour is from Monday to Friday only, it will not affect our operation of the clinic. A trained registered nurse from the occupational health office of Department of Health will be invited to provide a training of the rationale of the progressive muscle relaxation exercise. Two identical sessions will be held for all 10 nurses in the clinic. The venue for holding the lecture is the premises of the Department of Health. It can be borrowed for health education purpose without charges.

In addition, health education materials will be needed for the health promotion purpose. These include the printing materials such as pamphlets to introduce the progressive muscle relaxation exercise and VCDs which contain the demonstration of
the progressive muscle relaxation exercise. A designated hypertension care nurse will be appointed to discuss the design of the new pamphlet and a VCD on progressive muscle relaxation exercise with the Central Health Education Unit of the Department of Health, which are for the patients to bring home for practicing the exercise. Moreover, assessment and evaluation tools, manpower and equipments include a blood pressure monitor and a VCD player. Details will be shown in Appendix G.

3.6.2 Potential risks and benefits

The protocol of the progressive muscle relaxation exercise program for the families clinic is developed based on the best evidences that we gathered. The mode of the exercise, the duration and the frequency of the program are set up which based on the benefits of the patients.

Before the implementation of the new innovation to the patients, potential risks of the innovation should be taken into account. In the reviewed studies, there are no potential risks were documented. Indeed, there are many benefits of implementing the progressive muscle relaxation exercise to patients with hypertension, for example, the progressive muscle relaxation exercise can be acted with the synergy effects with other hypertension treatment such as anti- hypertensive drugs, exercise and balanced diet. If the proposed innovation being implemented, the hypertension patients may have a better control of the blood pressure. They may have a better quality of life
while the blood pressure are better controlled. Moreover, the nurse-patient relationship will be improved as they have more time to get along with each other.

Finally, it is anticipated that the job satisfaction of the nurses can be improved.

After balancing the costs and the benefits of the implementation of the progressive muscle relaxation exercise program, the benefits are clearly outweigh the costs. In the views of the transferability of the evidences, the feasibility and the cost-effectiveness of the program, the proposed program is considered as rewarding to carry out the innovation.
Chapter 4

Evidence-based practice protocol

This evidence-based practice protocol is developed in order to provide the guidelines for our healthcare professionals in the families clinic which under the Department of Health to carry out the progressive muscle relaxation exercise training program for the hypertension patients in an evidence-based, safe and efficacious way.

4.1 Title of the Protocol

The title of the protocol is "An Evidence-Based Guidelines of Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension"

4.2 Aim

The aim of the protocol is to provide evidence-based guideline for the doctors and nurses to perform progressive muscle relaxation exercise for hypertension patients.

4.3 Objectives

The objectives of the protocol are:

1. To provide information and guidelines for nurses to conduct an effective progressive muscle relaxation exercise training program for hypertension patients
2. To increase the awareness for the hypertension patients of the importance in performing progressive muscle relaxation exercise in order to have a better control of blood pressure and minimize the complications of uncontrolled blood pressure.

4.4 Intended users

The intended users of the protocol are the nurses and doctors of families clinic. They include nursing officers, registered nurses, senior medical officers and medical officers. A designated registered nurse is appointed to be in-charge of the progressive muscle relaxation exercise program. Other nursing staffs and doctors are invited to promote the program to the hypertension patients and making referral for the suitable patients to participate in the program.

4.5 Target Group

The target group of the protocol is the adult patients (aged eighteen or above) who are diagnosed for hypertension, no matter they are newly diagnosed to have hypertension or having hypertension for many years are all welcomed to join the progressive muscle relaxation exercise program. However, patients who are suffering from mental illnesses, physical abnormalities such as muscle damage which would affect their ability to perform relaxation techniques were excluded.

4.6 Grades of Recommendation

In this protocol, SIGN’s “Grades of Recommendation” (SIGN, 2012) is used to
indicate the level of the evidence for each recommendation.

4.7 Recommendations

There are altogether 8 recommendations are made in this protocol which based on the 5 chosen studies.

According to SIGN’s “Grades of Recommendation”, all 8 recommendations in the protocol are graded as “A”.

The details of the recommendation were shown in Appendix F.

Recommendation 1: Length of exercise training program (Grade A)

To make it beneficial to the patients, the program which lasts around 6 weeks would have effect to patients with hypertension, which means that they can have a better control of blood pressure [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++); Ranjbar, Akbarzadeh, Kazemi & Safaeiyan, 2007 (1++); Amigo, Fernadez & Herrera, 2002 (1-)].

Recommendation 2: Frequency of the progressive muscle relaxation exercise program (Grade A)

The progressive muscle relaxation exercise program should be 2 times a week in order to obtain its optimal effectiveness [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++); Ranjbar, Akbarzadeh, Kazemi & Safaeiyan, 2007 (1++); Amigo, Fernadez & Herrera, 2002 (1-)].
Recommendation 3: Duration of each progressive muscle relaxation exercise session (Grade A)

The duration for each progressive muscle relaxation exercise should last for 30 to 45 minutes [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++); Ranjbar, Akbarzadeh, Kazemi & Safaeiyan, 2007 (1++); Amigo, Fernadez & Herrera, 2002 (1-)].

Recommendation 4: Instructors of the program (Grade A)

The program should be provided by a trained and experienced instructor. In our target program, trained nurses will be the instructor of the program. Firstly, the nurses should explain the principles, procedures and goals of practicing progressive muscle relaxation exercise to the participants. Moreover, each session should be led by the same nurse. It can ensure all the procedures are standardized and build up a better relationship between the nurses and patients [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++); Amigo, Fernadez & Herrera, 2002 (1-)].

Recommendation 5: Practice progressive muscle relaxation exercise at home (Grade A)

Patients should practice progressive muscle relaxation between the follow-up interval, around one time per day. In addition, they should keep a record of their
practice [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++); Ranjbar, Akbarzadeh, Kazemi & Safaeiyan, 2007 (1++); Amigo, Fernadez & Herrera, 2002 (1-)].

**Recommendation 6: Audiotape of progressive muscle relaxation exercise (Grade A)**

An audiotape of progressive muscle relaxation exercise should be distributed to the patients on the first day of class so that they can practice at home with a standardized procedure [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-)].

**Recommendation 7: Place for the progressive muscle relaxation program (Grade A)**

A comfortable and quiet room should be provided for patients to practice progressive muscle relaxation exercise. Optimal temperature and lighting should be adjusted. [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al., 2005 (1++)].

**Recommendation 8: Mode of training of progressive muscle relaxation exercise (Grade A)**

Live demonstration of performing progressive muscle relaxation exercise should be provided by the nurse. Actual training should be given and finally feedback by the nurse on the patients performing progressive muscle relaxation exercise. [Yung, French & Leung, 2000 (1++); Sheu, Irvin, Lin & Mar, 2003 (1-); Schneider et al.,
2005 (1++); Amigo, Fernandez & Herrera, 2002 (1-)].
Chapter 5

Implementation Plan

After developing the evidence-based protocol, the next step is to design a clear and detailed implementation plan which consists of three parts, the first part is the communication plan, the second part is the pilot test and the last part is evaluation of the program.

5.1 Communication plan

A good communication plan is needed in order to have a better communication with the stakeholders. It is an effective way for us to deliver the messages to our target stakeholders and let them to have a better understanding of the proposed program.

Identify and analyze the stakeholders

The stakeholders are the people who get involved in the proposed program. It is important for the stakeholders to get involved in order to implement the intervention smoothly. They are the person who affected by the proposed protocol and can influent the innovations. To have a better communication with the stakeholders, a discussion group can be set up for them to express their concerns, exchange information and provide valuable advice.

The stakeholders of the proposed protocol are the Senior Nursing Officer, Nursing Officer, doctors, nurses and workmen of the unit of Professional
Development and Quality Assurance and Centre for Health Protection. In addition, the hypertensive patients who will join the proposed program are also the stakeholders.

5.2 Communication Process

All of the parties should be involved as they will be the responsible for the proposed program. Their effort and input are curial for the successful program.

The communication process can be started with the clinic Nursing Officer. She is at the administrative level. She is the most powerful and influential to the clinical issues. She has great experience in implementing the new health education program and their experience will be taken into account. She is also the facilitator of the program. She will help in co-coordinating for the proposed program of different involved parties. A PowerPoint will be done in order to present the ideas to her. It includes the significance of the problem of hypertension, the current situation of the hypertension in our clinic, the objectives and the significance of proposed program, the content of the proposed program, the expected outcomes and finally, the problems that we may encounter while implementing the proposed program. She would be invited to give her valuable though and suggestions. After obtaining the feedbacks from her, amendments will be made and the next step is to hold a formal meeting to the Senior Nursing Officer.

Next, a one-hour formal meeting will be held with the Senior Nursing Officer.
The revised PowerPoint will be presented to the Senior Nursing Officer. The PowerPoint which show to the Senior Nursing Officer is similar to the one presented to the Nursing Officer before. We will also focus on the cost-benefit ratio because they will be more concern of the budget. They will also asked to provide their productive comments and recommendations for us to do the improvement. After the amendments, it will get the approval from the Senior Nursing Officer and Nursing Officer before disseminate the proposed protocol to the doctors and nurses.

After having an updated proposed protocol, a meeting will be held among doctors and nurses in the clinic for the proposed program as they will help in recruiting and referring patients to join the program. Two identical one-hour briefing session will be arranged for them. They will be invited to introduce the program to the potential patients. Detailed information will be disseminated to them in the meeting. Moreover, the information of the program will be sent to them via internal e-mail. For every doctors, they will be given a file with the details of the proposed protocol and for nurses, a file which keep all the relevant stuffs of the program will be kept in the protocol cabinet in the nursing station, which they can be easily accessed.

A hypertension care nurse will be selected to be the responsible nurse of the program which based on voluntary-based. She will be the coordinators of the program between different parties. She will be taught how to run the proposed
program, including the brief introduction of hypertension, the management of hypertension, the importance of performing progressive muscle relaxation exercise and the proper way of performing progressive muscle relaxation exercise. She will also need to help the eligible patients to fill in the record of health including the home blood pressure, the amount of time in performing the progressive muscle relaxation exercise and the assessment form of the blood pressure every time while attending the proposed program.

All the parties that get involved in the proposed program are welcomed to give feedbacks and suggestions regarding to the program, whether they are positive and negative comments for improving the program in the future. It is an interactive communication mode between different parties. Feedbacks will be collected through the interview, suggestion box and email. The two responsible nurses and the nursing officer will be responsible for answering the questions and refine the program.

The eligible participants are also the stakeholders of the program. Posters of the progressive muscle relaxation exercise will be posted in the clinic. Nurses and doctors in the clinic are invited to explain the program to the patients, answer their questions and refer them to join the program. A pamphlet about the program will be distributed to the potential patients. Questionnaire will be distributed to the patients for obtaining the feedbacks and opinions of the proposed program.
In order to ensure the proposed program is up-to-date, it will be revised based on the new evidence collected. Suggestions are welcomed from different parties while the intervention is implemented. A luncheon meeting will be held for disseminated if there is any updated information to the staff.

5.3 Pilot Test

Before the implementation of the full-scale program, a pilot test, which is a small-scale preliminary test, is going to carry out first in order to evaluate the feasibility, time and cost. Five objectives are set for the pilot test, they are

1. To assess the feasibility of the proposed protocol
2. To identify the difficulties while implementing the protocol
3. To determine if there are any amendments needed for the protocol

The pilot test will be implemented in 14 weeks. The first 4 weeks will be used to recruit suitable patients. The other 6 weeks will be the intervention time and the next 4 weeks will be used for evaluation of the proposed program.

Participants of the pilot test

The hypertension care nurse will be responsible for providing the intervention to the eligible patients. She will be responsible for the 14-weeks proposed protocol. She will be given the training first. Her responsibilities include the recruitment of the suitable patients; assess the eligibility of the patients. She will hold the program
according to the proposed protocol.

**Patients’ recruitment**

We aim to recruit 5-8 hypertension patients to participate in the pilot test within 4 weeks. The nurses and doctors at the clinic will help to recruit the eligible patients. Those who meet the inclusion criteria and do not go against the exclusion criteria which mentioned in the previous chapter will be recruited. The hypertension care nurse for the proposed program will do the basic physical examination to the patients first and inform consent will be obtained from the eligible patients.

**Baseline assessment**

The hypertension care nurse will record the basic information for the patients before the intervention started. Theses include their systolic and diastolic blood pressure, pulse and perceived stress scale in their own log book.

**Intervention**

The hypertension care nurse will be involved in the pilot test. She has to take care 5-8 patients. The program is a 45- minute group- based exercise, which will hold once per week. The nurse will do the demonstration, then the patients will follow. Then the nurse will give feedback to patients on their performance in performing progressive muscle relaxation exercise. Patients are required to record down their exercise progress in the exercise logbook which distributed to them at the beginning
of the program during each exercise session.

5.4 Pilot Test Evaluation

The aim of the pilot test is to determine the feasibility of the program, including the recruitment of patients and the effectiveness of the delivery of the intervention. The program will be evaluated if it is delivered as we being planned. Hence, the compliance of the nurses who involved in the proposed protocol will be reviewed. They will be assessed if they follow the proposed protocol to implement the intervention.

To do the evaluation, a semi-structured interview will be arranged with the nurses, doctors and eligible patients who involved in the proposed protocol. The doctors and nurses can be expressed their opinion and feelings towards the program including the strengths and weakness, the difficulties that they encountered. For the patients, we will distribute the questionnaire to them for collecting their opinions towards the satisfaction level, the room for improvement and their acceptance level of the program (Appendix I &J).

All the gathered comments will be used for improving our program. After the refinement of the proposed protocol, the result of the pilot test will be presented to the involved parties including the administrative staff, doctors and nurses. Finally a full-scale of implementation will start.
Chapter 6

Evaluation Plan

The aim of the evaluation plan helps us to assess the effectiveness for the changes of the proposed protocol.

Parties who involved in the evaluation plan include the hypertension patients, the doctors and nurses participated in the progressive muscle relaxation exercise for hypertension patients.

6.1 Objectives

The objectives of the evaluation plan are:

- To identify if the outcome achieved by the protocol
- To determine the time interval of taking measurement
- To establish the basis for the effectiveness of the changes

6.2 Characteristics and numbers of patients involved

The number of patients to get involved is based on the primary outcome of the program. The primary outcome of the program is the blood pressure. This program will employ the study design of pre- test and post- test. Two-tailed paired t-test will be used. The Ruth Lenth’s Java Applets (2013) for power and sample size is used for the calculation. The level of significance is taken as 0.05 and the power is taken as 0.8, which based on the reviewed studies. Based on the calculation, 45 participants are
needed to recruit and the estimated recruitment period would be in 6 weeks time.

6.3 Identify the outcomes

To evaluate the program of the progressive muscle relaxation exercise for hypertension patients, the patient outcomes, healthcare providers outcome and the system outcome will be considered. The program is classified as successful if the expected outcomes are achieved.

The nurses and doctors are responsible to recruit the eligible patients to join the progressive muscle relaxation exercise program. Then the responsible nurse will take the baseline systolic and diastolic blood pressure, pulse, perceived stress scale of the participants of the innovation in their own log book, ten minutes before the intervention starts. Post intervention systolic and diastolic blood pressure, pulse, perceived stress scale will be recorded by the nurse ten minutes after the intervention ends.

Patient outcomes

As the proposed program is aimed to have a better control of blood pressure among the hypertension patients, based on the reviewed articles, it is expected the hypertension patients who perform the progressive muscle relaxation exercise will have a better control of blood pressure, both the systolic and diastolic blood pressure are expected to be lower than before, 10 mmHg for systolic blood pressure and 5
mmHg for diastolic blood pressure, based on the review articles.

Other patient outcomes include the time that they perform the progressive muscle relaxation exercise at home and their satisfaction level. They will ask to record down the duration and the frequency when they perform progressive muscle relaxation exercise. The patients' outcome will be measured using a self-developed questionnaire which shown in Appendix L.

*Healthcare provider outcomes*

The compliance of the protocol with the healthcare providers will be evaluated. Doctors and nurses are required to recruit the hypertension patients to join the progressive muscle relaxation exercise program and assess the eligibility of the patients with hypertension. Doctors and nurses are required to do the documentation in the kardex.

The nurses, who are in-charge in the proposed program to provide training to the patients, will be assessed for their competency, their knowledge and their satisfactory level towards the program.

The healthcare providers' outcome will be measured using a self-developed questionnaire which shown in Appendix K.

*Knowledge*

The knowledge for the healthcare providers toward the progressive muscle
relaxation exercise to the hypertension patients will be evaluated. It will be assessed by a quiz which contain 10 multiple choice questions. The content will be developed by the innovators and screened by the senior nursing office and nursing officer. They will regard as pass if he/she answer 85% of questions correct. The questionnaire will be distributed to them immediately after they attend the training course. In addition, the questionnaire will be distributed to them again after the first batch of intervention completed.

*The attitude toward the protocol*

The attitude toward the protocol will also be examined. It will be done by the focus group interview which last for 30-45 minutes with the nurses and doctors. Different aspects toward the program will be assessed. The first one will be the effectiveness of the program in promoting the progressive muscle relaxation exercise of patients. The second one will be the workload level after the implementation of the program and finally the confidence in implementing the progressive muscle relaxation exercise to the patients. The focus group will be held 8 weeks after the implementation of the program. It will classified as effective if they show positive attitude toward the program.
System Outcome

Cost

The costs and expenses include the money which spend in designing new teaching materials and the labor costs. It can be viewed as effective if the cost for running the first year of the program is less than $100000. It will be evaluated one year after the implementation of the program.

The utilization of the program can be evaluated by the number of eligible patients who are willing to join the program.
Chapter 7

Conclusion

Exercise is one of the effective healthy lifestyle methods in controlling the blood pressure. However, many hypertension patients always claimed it is difficult for them to squeeze time to perform any exercise. After reviewing the previous studies, a 30-minute progressive muscle relaxation exercise is evidenced that effective in better control of hypertension.

5 relevant studies were reviewed and there is sufficient evidence show the efficacy of the proposed innovation. Progressive muscle relaxation exercise which conducted by the nurses is found beneficial to the hypertension patients. It can also enhance patients' psychological status include perceived stress and perceived health.

A pilot study will be run before the program start. The feasibility of the innovation is being tested. A comprehensive evaluation plan was developed for assessing the effectiveness of the program. An evidence-based guideline on progressive muscle relaxation exercise for hypertension patients is therefore developed for the healthcare professionals in a primary health care setting. In addition, finally, it is expected to promote this program to the entire outpatient clinic in Hong Kong.
References


### Appendix A: Search strategies

#### Summary of Bibliographic Database Search Strategy and Results

<table>
<thead>
<tr>
<th>Search items</th>
<th>Medline (Ovid SP)</th>
<th>PubMed</th>
<th>ISI web of knowledge</th>
<th>The PsycINFO database</th>
<th>Cochrane Library</th>
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<td>10372</td>
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<td>2) High blood pressure</td>
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<td>83202</td>
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<td>3) Relaxation therapy</td>
<td>5706</td>
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<td>6043</td>
<td>6755</td>
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<td>4) Progressive muscle relaxation</td>
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<td>5) (1) or (2) and (3) or (4)</td>
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<td>6) (1) and (4)</td>
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<td>96</td>
<td>4</td>
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</tr>
<tr>
<td>6) Limited to randomized controlled trial</td>
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### Appendix A: Search strategies

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<td>7) No. of citation included</td>
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<td>9) Articles retrieved from references</td>
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<td>10) Total number of articles reviewed</td>
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Search date: 31th August, 2012
### Appendix B: Level of Evidence

**SIGN grading system: Level of evidence (Scottish Intercollegiate Guidelines Network, 2012)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>1++</td>
<td>High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias</td>
</tr>
<tr>
<td>1+</td>
<td>Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias</td>
</tr>
<tr>
<td>1-</td>
<td>Meta-analyses, systematic reviews, or RCTs with a high risk of bias</td>
</tr>
<tr>
<td>2++</td>
<td>High quality systematic reviews of case control or cohort studies</td>
</tr>
<tr>
<td></td>
<td>High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal</td>
</tr>
<tr>
<td>2+</td>
<td>Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal</td>
</tr>
<tr>
<td>2-</td>
<td>Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytic studies, e.g. case reports, case series</td>
</tr>
<tr>
<td>4</td>
<td>Expert opinion</td>
</tr>
</tbody>
</table>

*RCT: Randomized controlled trial.  
**Studies with a level of evidence- should not be used as a basis for giving an instruction.*

Appendix C: Bibliographic citation of selected studies


## Appendix D: Quality Assessment of studies

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<tr>
<th>Study Type: RCT</th>
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<td>1. Did the study ask a clearly-focused question?</td>
<td>Yes. Population, intervention and outcomes stated clearly in research questions.</td>
</tr>
<tr>
<td>2. Was this a randomized controlled trial (RCT) and was it appropriately so?</td>
<td>Yes. RCT is the right approach for the study.</td>
</tr>
<tr>
<td>Is it worth continuing?</td>
<td></td>
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<tr>
<td>3. Were participants appropriately allocated to intervention and control groups?</td>
<td>Yes. The method of randomization was not mentioned. Groups are balanced with no significant differences.</td>
</tr>
<tr>
<td>4. Were participants, staff and study personnel &quot;blind&quot; to participants study group?</td>
<td>No. Blinding is not possible to the study group.</td>
</tr>
<tr>
<td>5. Were all of the participants who entered the trial accounted for at its conclusion?</td>
<td>Yes. All the result accounted for the conclusion.</td>
</tr>
<tr>
<td>6. Were the participants in all groups followed up and data collected in the same way?</td>
<td>Yes. The data collected from all the participants with the same assessment tools.</td>
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<td>7. Did the study have enough participants to minimize the play of chance?</td>
<td>Cannot tell. No power of calculated for the appropriate size of subjects.</td>
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<td>8. How are the results presented and what is the main result?</td>
<td>SBP and DBP decrease significantly after the intervention. Mean HR increase 0.05/ min</td>
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<tr>
<td>9. How precise are these results?</td>
<td>P value &amp; Mean stated in each outcome measures, no CI reported.</td>
</tr>
<tr>
<td>10. Were all important outcomes considered so the results can be applied?</td>
<td>Yes. The population is the same of mine.</td>
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| Level of evidence | 1++ |

---
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tr>
<td>1. Did the study ask a clearly-focused question?</td>
<td>Yes. Population, intervention and outcomes stated clearly in research questions.</td>
</tr>
<tr>
<td>2. Was this a randomized controlled trial (RCT) and was it appropriately so? Is it worth continuing?</td>
<td>Yes. Quasi-experimental is the right approach for the study.</td>
</tr>
<tr>
<td>3. Were participants appropriately allocated to intervention and control groups?</td>
<td>Yes. The method of randomization was not mentioned. Groups are balanced with no significant differences.</td>
</tr>
<tr>
<td>4. Were participants, staff and study personnel &quot;blind&quot; to participants study group?</td>
<td>No. Blinding is not possible to the study group.</td>
</tr>
<tr>
<td>5. Were all of the participants who entered the trial accounted for at its conclusion?</td>
<td>Yes. All the result accounted for the conclusion.</td>
</tr>
<tr>
<td>6. Were the participants in all groups followed up and data collected in the same way?</td>
<td>Yes. The data collected from all the participants with the same assessment tools.</td>
</tr>
<tr>
<td>7. Did the study have enough participants to minimize the play of chance?</td>
<td>Cannot tell. No power of calculated for the appropriate size of subjects.</td>
</tr>
<tr>
<td>8. How are the results presented and what is the main result?</td>
<td>SBP, DBP &amp; HR decrease statistically significantly after the intervention.</td>
</tr>
<tr>
<td>9. How precise are these results?</td>
<td>P value stated in each outcome measures, no CI reported.</td>
</tr>
<tr>
<td>10. Were all important outcomes considered so the results can be applied?</td>
<td>Yes. The population is the same of mine.</td>
</tr>
</tbody>
</table>

**Level of evidence:** 1-
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did the study ask a clearly-focused question?</td>
<td>Yes. Population, intervention and outcomes stated clearly in research questions.</td>
</tr>
<tr>
<td>2. Was this a randomized controlled trial (RCT) and was it appropriately so? Is it worth continuing?</td>
<td>Yes. RCT is the right approach for the study.</td>
</tr>
<tr>
<td>3. Were participants appropriately allocated to intervention and control groups?</td>
<td>Yes. The method of randomization was not mentioned. Groups are balanced with no significant differences.</td>
</tr>
<tr>
<td>4. Were participants, staff and study personnel &quot;blind&quot; to participants study group?</td>
<td>No. Blinding is not possible to the study group.</td>
</tr>
<tr>
<td>5. Were all of the participants who entered the trial accounted for at its conclusion?</td>
<td>No, 197 participants recruited but only 150 of them completed the study. The drop out rate was 24%.</td>
</tr>
<tr>
<td>6. Were the participants in all groups followed up and data collected in the same way?</td>
<td>Yes. The data collected from all the participants with the same assessment tools.</td>
</tr>
<tr>
<td>7. Did the study have enough participants to minimize the play of chance?</td>
<td>Cannot tell. No power of calculated for the appropriate size of subjects.</td>
</tr>
<tr>
<td>8. How are the results presented and what is the main result?</td>
<td>DBP decrease statistically significantly after the intervention.</td>
</tr>
<tr>
<td></td>
<td>SBP decrease clinically significantly after the intervention.</td>
</tr>
<tr>
<td>9. How precise are these results?</td>
<td>P value stated in each outcome measures, no CI reported.</td>
</tr>
<tr>
<td>10. Were all important outcomes considered so the results can be applied?</td>
<td>Yes. The population is the same of mine.</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>1++</td>
</tr>
<tr>
<td></td>
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<tr>
<td>---</td>
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</tr>
<tr>
<td>Study Type: RCT</td>
<td></td>
</tr>
<tr>
<td>1. Did the study ask a clearly-focused question?</td>
<td>Yes. Population, intervention and outcomes stated clearly in research questions.</td>
</tr>
<tr>
<td>2. Was this a randomized controlled trial (RCT) and was it appropriately so? Is it worth continuing?</td>
<td>Yes. RCT is the right approach for the study.</td>
</tr>
<tr>
<td>3. Were participants appropriately allocated to intervention and control groups?</td>
<td>Yes. The method of randomization was not mentioned. Groups are balanced with no significant differences.</td>
</tr>
<tr>
<td>4. Were participants, staff and study personnel &quot;blind&quot; to participants study group?</td>
<td>Yes. the cardiologist that provided diet advice and checked the drug complications was unaware of the allocation of the patients</td>
</tr>
<tr>
<td>5. Were all of the participants who entered the trial accounted for at its conclusion?</td>
<td>No, 220 participants recruited but only 186 of them completed the study. The drop out rate was 20%.</td>
</tr>
<tr>
<td>6. Were the participants in all groups followed up and data collected in the same way?</td>
<td>Yes. The data collected from all the participants with the same assessment tools.</td>
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<tr>
<td>7. Did the study have enough participants to minimize the play of chance?</td>
<td>Yes. If power= 0.8, population should be 182 and 186 people completed the study.</td>
</tr>
<tr>
<td>8. How are the results presented and what is the main result?</td>
<td>SBP &amp; DBP decrease statistically significantly after the intervention.</td>
</tr>
<tr>
<td>9. How precise are these results?</td>
<td>P value stated in each outcome measures, no CI reported.</td>
</tr>
<tr>
<td>10. Were all important outcomes considered so the results can be applied?</td>
<td>Yes. The population is the same of mine.</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>1++</td>
</tr>
<tr>
<td>Study Type: Quasi-experimental study</td>
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<td>------------------------------------</td>
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</tbody>
</table>
| 1. Did the study ask a clearly-focused question? | Yes. Population, intervention and outcomes stated clearly in research questions.  
| 2. Was this a randomized controlled trial (RCT) and was it appropriately so? Is it worth continuing? | Yes. Quasi-experimental is the right approach for the study.  
| 3. Were participants appropriately allocated to intervention and control groups? | Yes. The method of randomization was not mentioned. Groups are balanced with no significant differences.  
| 4. Were participants, staff and study personnel "blind" to participants study group? | Yes. The nurses and doctors who were involved in the study were blinded to the participants' treatment group  
| 5. Were all of the participants who entered the trial accounted for at its conclusion? | Yes. All the result accounted for the conclusion.  
| 6. Were the participants in all groups followed up and data collected in the same way? | Yes. The data collected from all the participants with the same assessment tools.  
| 7. Did the study have enough participants to minimize the play of chance? | Cannot tell. No power of calculated for the appropriate size of subjects.  
| 8. How are the results presented and what is the main result? | SBP, DBP & HR decrease statistically significantly after the intervention.  
| 9. How precise are these results? | P value & SD stated in each outcome measures, no CI reported.  
| 10. Were all important outcomes considered so the results can be applied? | Yes. The population is the same of mine.  

| Level of evidence | 1- |
Appendix E: Table of evidence

<table>
<thead>
<tr>
<th>Study type</th>
<th>No of patients</th>
<th>Patient characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>9</td>
<td>Patients were being diagnosed HT at registered medical practitioner</td>
<td>1. PMR: Progressive muscle relaxation exercise (n=3) 2. SR: Stretch release relaxation (n=3) 3. COG: Cognitive imagery relaxation (n=3)</td>
<td>30-day</td>
<td>SBP, DBP, HR</td>
<td>Mean SBP reduction: PMR-15.5 mmHg SR-7.3 mmHg COG-13.3 mmHg Mean DBP reduction: PMR-8.5 mmHg SR-10.2 mmHg COG-9.5 mmHg Mean HR reduction: PMR +0.05/ min SR-8/ min COG-0.2/ min</td>
<td>SR: Statistically significant in SBP at the pre-treatment/ follow-up measure</td>
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<tr>
<td></td>
<td></td>
<td>Age: 31-55 years old Mean age: 43 years old 4 male, 5 female</td>
<td>20 min/ time, twice a week for the treatment session Practice one time at home everyday at the end of the 8th session with an audiotape given</td>
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<tr>
<td></td>
<td></td>
<td>SBP: 155 mmHg DPS: 96 mmHg HR: 76.8/ min</td>
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</tbody>
</table>
(P<0.05) and DBP at the pre-post treatment measure (p<0.05) and pre-treatment/follow-up measure (p<0.05)

PMR: Statistically significant in SBP for pre-post treatment measures (p<0.05)

COG: No statistically significant in blood pressure reduction

Statistically significant in SBP (P<0.01) between three groups

No statistically significant in DBP (P=0.59) and HR (p=0.71) between three groups

<table>
<thead>
<tr>
<th>Study type</th>
<th>No of patients</th>
<th>Patient characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
</table>
| RCT        | 150            | Patients from the local health centers, senior citizens' centers, churches and the Department of Aging program | **Transcendental meditation**
Practice 20 min twice a day, 3 follow-up sessions at 3 consecutive days, 1.5 hours per day
Patients have to practice at home
Received instruction and written educational materials on CVD risk factors reduction. (n=54) | **Progressive muscle relaxation**
Practice PMR at home for 15-20 min, twice a day
Received instruction and written educational materials on CVD risk factors reduction. (n=52) | 12 mo | SBP, DBP | Effects of post-test periods during 12-month follow-up period
Systolic blood pressure
TM group: -3.12 +/- 1.52 mmHg (p=0.02)
PMR: -0.54 +/- 1.52 mmHg (p=NS)
HE: -0.9 +/- 1.71 mmHg (p=NS) | Diastolic blood pressure
TM group: -5.67 +/- .89 mmHg (p<0.01)
PMR: -2.9 +/- 0.89 mmHg (p<0.01)
HE: -2.59 +/- 1.00 mmHg (p<0.01) |

Mean age: 49 +/- 10 years old
Mean blood pressure: 142/95 mmHg
Female: 52.7%
Male: 47.3%
cooking at home for 20 min twice per day. (n=44)


<table>
<thead>
<tr>
<th>Study type</th>
<th>No of patients</th>
<th>Patient characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single blind RCT</td>
<td>220</td>
<td>Mean age: 55 years old</td>
<td>Received anti-hypertensive drug plus Jacobson's progressive muscle relaxation therapy, 2 times/ week, for eight weeks, 30-45 min/ session</td>
<td>Standard therapy of anti-hypertensive drug plus general health education on better control of BP (n=110)</td>
<td>8 weeks</td>
<td>SBP</td>
<td>Normal SBP and DBP control: below 140 mmHg and 90mmHg 59 % had good control of BP in intervention groups (p&lt; 0.007) 36 % had good control of BP in control group Intervention group: decrease 12 mmHg in SBP Decrease 2 mmHg in DBP</td>
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<tr>
<td></td>
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<td>Mean BP level for intervention group: 192.86/ 105.16 mmHg</td>
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<td></td>
<td>DBP</td>
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<tr>
<td></td>
<td></td>
<td>Mean BP level for control group:192.09/ 102.25 mmHg</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Study type</th>
<th>No of patients</th>
<th>Patient characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quasi-experimental</td>
<td>40</td>
<td>Hypertension outpatient clinic of a teaching hospital in Kaoshiung city</td>
<td>PMR training carried out for 4 weeks, with one session a week, 30 min/session + self-practice at home</td>
<td>Anti-hypertensive drug (n=20)</td>
<td>4-week</td>
<td>SBP, DBP, Pulse, Perceived stress Scale, Perceived Health Scales</td>
<td>Immediate effect: Average decrease 1.95-3 pulse/min SBP: Average reduce 3.7-6.5 mmHg DBP: Average reduce 3-3.8 mmHg Significant differences between experimental and control groups for pulse (p&lt;0.01), systolic pressure (p&lt;0.01) and diastolic pressure (p&lt;0.05) After 4 weeks SBP: 5.1 mmHg DSP: 3.6 mmHg Pulse: reduce 2.9 beats/min Significant differences between experimental and control groups for pulse (p&lt;0.01), systolic pressure (p&lt;0.01) and diastolic pressure (p&lt;0.05) Perceived stress Scale: reduce 3.55 points (p&lt;0.001) Significant differences between experimental and control groups (p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age: 31-74 years old</td>
<td>Bring the audiotape of PMR home, practice once a day at home</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Mean age: 54.98 years old</td>
<td>Anti-hypertensive drug (n=20)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Male 37.5%</td>
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<tr>
<td></td>
<td></td>
<td>Female 62.5%</td>
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<tr>
<td></td>
<td></td>
<td>Average time since diagnosis with HT: 81.83 days</td>
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</tbody>
</table>
Perceived Health Scales: increase 0.85 points (p<0.001) Significant differences between experimental and control (p<0.001).


<table>
<thead>
<tr>
<th>Study type</th>
<th>No of patients</th>
<th>Patient characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow up</th>
<th>Outcome measures</th>
<th>Effect size</th>
</tr>
</thead>
</table>
| Quasi-experimental | 40             | Participants from Hypertension unit of Asturias General Hospital, Oviedo (Spain) Age between 18- 60 years old Mean age: 47.8 years old | Unmedicated relaxation n=10  
Medicated relaxation n=10  
Progressive muscular relaxation program of eight sessions, 1 hour weekly  
Homework assignments to provide self-control over stressful situations | Unmeidcated control n=10  
Medicated control n=10  
Attend hypertension unit 1 time a week for 8 weeks | 6 months | SBP  
Intervention  
Unmediated Relaxation  
SBP: 141.5 (SD: 14.84) → 128.2 (SD: 11.52) p<0.000 | DBP  
Medicated Relaxation  
DBP: 90.1 (SD: 10.52) → 78.8 (SD: 7.9) p< 0.011 | HR  
SBP: 134.2(SD: 12.73) → 125 (SD: 9.78) |

p<0.050
<table>
<thead>
<tr>
<th></th>
<th>Daily practice of relaxation therapy</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24 female, 16 male</td>
<td>DBP: 90-104 mmHg</td>
<td>p&lt;0.001</td>
<td></td>
<td>DBP: 85 (SD: 10.31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR: 76.8 (SD: 10.17)</td>
</tr>
<tr>
<td>Control</td>
<td></td>
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</tr>
<tr>
<td>Unmedicated Control</td>
<td>SBP: 134.5 (SD: 8.12)</td>
<td>141.2 (SD: 9.45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DBP: 86.5 (SD: 8.93)</td>
<td>89.5 (SD: 6.84)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HR: 81.7(SD: 8.12)</td>
<td>83.4 (SD: 6.6)</td>
<td></td>
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</tr>
<tr>
<td>Medicated Control</td>
<td>SBP: 140.1(SD: 16.99)</td>
<td>146.8 (SD: 11.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DBP: 85.9 (SD: 10.18)</td>
<td>89.5 (SD: 11.08)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|                | HR: 71.6 (SD:13.28) | 77.1 (SD:14.62) |                | DBP: not statistically significant at
<table>
<thead>
<tr>
<th></th>
<th>post-treatment</th>
<th>6-month follow-up: statistically significant (p&lt; 0.000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SBP</strong></td>
<td>Statistically significant at post-treatment (p&lt;0.000)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6-month follow-up: statistically significant (p&lt; 0.000)</td>
<td></td>
</tr>
<tr>
<td><strong>HR</strong></td>
<td>Statistically significant at post-treatment (p&lt;0.011)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6-month follow-up: not statistically significant</td>
<td></td>
</tr>
</tbody>
</table>
**Appendix F: Grade of Recommendation**

SIGN grading system: Grade of Recommendation

(Scottish Intercollegiate Guidelines Network, 2012)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>At least one meta analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results</td>
</tr>
<tr>
<td>B</td>
<td>A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+</td>
</tr>
<tr>
<td>C</td>
<td>A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++</td>
</tr>
<tr>
<td>D</td>
<td>Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+</td>
</tr>
<tr>
<td>D(GPP)*</td>
<td>Recommended best practice based on the clinical experience of the guideline development group</td>
</tr>
</tbody>
</table>

* GPP: good practice points.

## Appendix G: Budget Plan for the Proposed Program

<table>
<thead>
<tr>
<th>Budget Plan</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Staff cost: Registered Nurses</td>
<td>No extra manpower needed</td>
</tr>
<tr>
<td>2 Venue for implementing the innovation</td>
<td>Clinic provision</td>
</tr>
<tr>
<td>3 VCD player</td>
<td>Clinic provision</td>
</tr>
<tr>
<td>4 Computer, projector device</td>
<td>Clinic provision</td>
</tr>
<tr>
<td>5 Blood pressure monitor</td>
<td>Clinic provision</td>
</tr>
<tr>
<td>6 Health education VCD for patients x 100</td>
<td>$10/patient x 100 = $1000</td>
</tr>
<tr>
<td>7 Health education pamphlet for patients x 100</td>
<td>$5/patient x 100 = $500</td>
</tr>
<tr>
<td>8 Exercise logbook for patients x 100</td>
<td>$10/patient x 100 = $1000</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>$2500</strong></td>
</tr>
</tbody>
</table>
### Appendix H: Timetable for the implementation of the new innovation

<table>
<thead>
<tr>
<th>Months</th>
<th>1</th>
<th>……</th>
<th>6</th>
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<th>8</th>
<th>9</th>
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<tr>
<td>Systematically search of relevant evidence/studies</td>
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<tr>
<td>Choosing and summarizing the collected research that relates to the identified need</td>
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<tr>
<td>Development of the evidence-based guideline</td>
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<tr>
<td>Communication with administrative staff, get approval from them</td>
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<td>Revise the guideline</td>
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<td>Communication of the frontline staffs</td>
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<td>Provide training to the staffs</td>
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<td>Implementation of the innovation</td>
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<td>Evaluation of the innovation</td>
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Appendix I

Department of Health

Professional Development & Quality Assurance

Questionnaire for the evaluation of nurses for the pilot test

Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension

(Please write down your comments)

1. What are the problems and difficulties that you experienced while recruited the patients to the program?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. What are the problems and difficulties that you experienced while carried out the intervention to the patients?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
3. How much do you think the patients comply with the intervention?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4. What other suggestions or comments do you have for the intervention?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Appendix J

Department of Health

Professional Development & Quality Assurance

Questionnaire for the evaluation of patients for the pilot test

Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension

Please answer each question by circling the letter on the graded scale.

1. Program content

How would you rate the content?

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

How was the level of the program?

| Too advanced | | Too simple |
|--------------|----------------|
| a            | b              | c          | d |

2. Administration

How satisfied were you with the planning and organizing?

| Completely | | Not at all |
|------------|----------------|
| a          | b            | c          | d |
How satisfied were you with accommodation (seating and audibility)?

<table>
<thead>
<tr>
<th>Completely</th>
<th></th>
<th></th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

3. Teaching Aids

How satisfied were you with the visual aids?

<table>
<thead>
<tr>
<th>Completely</th>
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<th></th>
<th>Not at all</th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
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</tbody>
</table>

How satisfied were you with the handouts?

<table>
<thead>
<tr>
<th>Completely</th>
<th></th>
<th></th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

4. Teaching Effectiveness

How satisfied were you with the lecturer?

<table>
<thead>
<tr>
<th>Completely</th>
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<th></th>
<th>Not at all</th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
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</tbody>
</table>

How satisfied were you with the methods of instruction?

<table>
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<tr>
<th>Completely</th>
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<th></th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
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</table>
5. General Comments

Please suggest any other recommendations which would benefit for the future participants.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Date: __________________________
Appendix K

Department of Health

Professional Development & Quality Assurance

Questionnaire for the evaluation of nurses for the full-scaled implementation of the innovation

Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension

Please answer each question by circling the letter on the graded scale.

1. How would you rate the skills of your teaching?

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
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<td>a</td>
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</tbody>
</table>

2. How would you rate the flow of the program?

<table>
<thead>
<tr>
<th>Very satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

3. How would you rate the workload of the program?

<table>
<thead>
<tr>
<th>Too heavy</th>
<th>Just right</th>
<th>Not at all</th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
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</tbody>
</table>
4. How satisfied were you with guideline for you to implement the innovation to your patients?

<table>
<thead>
<tr>
<th>Very satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
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</table>

5. How satisfied were you with the teaching materials and handouts?

<table>
<thead>
<tr>
<th>Very satisfied</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Dissatisfied</th>
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</thead>
<tbody>
<tr>
<td>a</td>
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What other suggestions or comments do you have for the improvement of the innovation?

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Date: __________________________
Appendix L

Department of Health

Professional Development & Quality Assurance

Questionnaire for the evaluation of patients for the full- scaled implementation of the innovation

Using Progressive Muscle Relaxation Exercise in Maintaining Optimal Blood Pressure for Adult Patients with Hypertension

Please answer each question by circling the letter on the graded scale.

1. Program content

How would you rate the content?

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
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</tbody>
</table>

How was the level of the program?

| Too advanced | | Too simple |
|--------------|--------------|
| a            | b            | c           | d |

2. Administration

How satisfied were you with the planning and organizing?

| Completely | | Not at all |
|------------|--------------|
| a          | b            | c           | d |
How satisfied were you with accommodation (seating and audibility)?

<table>
<thead>
<tr>
<th>Completely</th>
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<table>
<thead>
<tr>
<th>Completely</th>
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<th>Not at all</th>
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<tbody>
<tr>
<td>a</td>
<td>b</td>
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</table>

How satisfied were you with the handouts?

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<th>Completely</th>
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<tr>
<td>a</td>
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</table>

4. Teaching Effectiveness

How satisfied were you with the lecturer?

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<tr>
<th>Completely</th>
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<td>a</td>
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How satisfied were you with the methods of instruction?

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<th>Completely</th>
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<td>a</td>
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</table>
5. General Comments

Please suggest any other recommendations which would benefit for the future participants.


Date: ____________________________